TRIP REPORT

Name of Traveler(s): John Marmion

Place(s) Visited: Belize

Dates Visited: 6/10-15/2012

I. Background

The Americas experienced a re-emergence of malaria in the 1990's and began to see P. falciparum resistance to first line medicines. In response to the increase in incidence and the therapeutic failures, the United States Agency for International Development (USAID) launched the Amazon malaria Initiative (AMI) in 2001. The objective was to improve the control and treatment of malaria in the Amazon basin countries: Bolivia, Brasil, Colombia, Ecuador, Guyana, Peru and Suriname.

Management Sciences for Health (MSH), through the projects Rational Pharmaceutical Management Plus, Strengthening Pharmaceutical Systems (SPS) and Systems for Improved Access to Pharmaceuticals and Services (SIAPS), has been an AMI technical partner since 2002 to support the management of drug supply. MSH/SIAPS has strengthened the national malaria control programs' capacity to develop strategies to improve the supply of medicines and supplies with the assistance of other AMI partners.

The Central American countries were incorporated into AMI in the late 2000's. In recent AMI strategic meetings, the Central American countries asked for technical assistance to evaluate their malaria control strategies.

MSH consultant, Walter Flores, designed a study to evaluate the Central American malaria control programs strategies based on his previous study," Impact of artemisinin-based combination therapy on malaria in different countries and the implications for those countries in the Amazon basin." The current study of Central American malaria control programs has two objectives:

1. Complete a rapid assessment of the performance of malaria control strategies. The evaluation will assess the adequacy of the implementation of the control strategies.
2. Propose recommendations to improve selection, procurement, distribution and use of medications and steps needed to systematize the process and management tools in the future.

MSH consultant, John Marmion, planned a data collection trip to Belize, the last participating Central American country. The plan included a meeting with the Vector Control Program Manager and other key informants in the country. The visit would serve to collect epidemiological data, program and coverage data, standard treatment guidelines and program protocols. The visit would include two in-depth interviews to acquire qualitative information about the program. Lastly, the consultant planned collect data on the medicine supply system to report the mechanisms involved in the countries drug management.

II. Purpose of Trip, Scope of Work and Key Objectives

The principal purpose of the trip was to collect data for the adequacy of the implementation of malaria control strategies in Central American countries. The consultant was sent to collect data on the malaria

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program and review collected data with the program director. Data collection would include two in-depth interviews with two key informants from the vector control program/malaria program. The key informants should have key knowledge about the countries drug management cycle for malaria medications and program details and program strategies in regards to parasite elimination.

The secondary purpose of the trip was to collect information on the malaria drug management cycle. The data would be used to write an informational document on the medication supply management as an annex to this trip report.

The scope of work as specified in the terms of reference indicate MSH consultant John Marmion to collect data at the countries vector control program/malaria program's headquarters in Belmopan, Belize for the adequacy of the implementation of control strategies. The consultant would conduct two in-depth interviews and collect epidemiological, coverage and program data which would be useful in understanding the program so recommendations could be made by the principal investigator. A secondary objective stated in the Terms of reference was to collect drug supply management data to inform Belize, AMI partners what the malaria drug management system functions.

III. Activities, Principal Findings and Accomplishments

The principal activities focused on data collection for the adequacy of the implementation of malaria control strategies and for a report pertaining to the drug management cycle. All information was collected from two key personnel in the vector control program, which includes overseeing activities for malaria control. Mr. Kim Bautista is the current chief of operations of the vector control program and Mr. Francis Westby is the past chief of operations of the vector control program and is currently a dengue technical associate for the vector control program.

There were meetings on four days to collect the needed information from the vector control program. The first day was principally devoted to collecting data regarding the drug supply cycle, discussing background information of the program and planning activities for the remaining data collection. Day two was spent conducting the in-depth interviews and the third day was used to collect protocols, epidemiological data and provided the bulk of the answers to the questions in the four instruments. The fourth day was used to collect relevant surveillance data and protocols from a field office.

1. **Collect malaria coverage and epidemiological data, program protocols and guidelines for the four study instruments**. The consultant met with Kim Bautista and Francis Westby from the vector control program to complete all of the instruments. The team gave information regarding the coverage, epidemiological data and protocols and guides to the MSH consultant. The documents were reviewed to ensure all needed information was included to satisfy the four study instruments. The collected data and completed instruments were forwarded to Walter Flores to validate and review.

2. **Conduct in-depth interviews of the key informants for the vector control program/malaria program.** The MSH consultant conducted two in-depth interviews with Kim Bautista and Francis Westby about the malaria program on June 12, 2012. The interviews gathered principal data about the functioning of the malaria program within the vector control services, program

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changes needed to move from a control phase to an elimination or pre-elimination phase, and antimalarial drug supply management in the country.

3. **Collect information pertaining to the antimalarial drug cycle in the country.** The consultant met with Kim Bautista and Francis Westby to discuss the malaria program as it functions within the vector control program. The discussion reviewed all aspects of the drug supply cycle as presented in the MSH Managing Drug Supply manual. The consultant and Vector Control Services personnel explained the selection, procurement, distribution and use of antimalarials within the country. The results and description of the malaria programs medication supply is detailed in Annex 3.

IV. Follow-up Actions Needed

Action	Person (s) Responsible	Estimated Completion Date	Location of Work
a. Collect remaining background information identified after consultant finished in country data collection	John Marmion and Kim Bautista	6/30/2012	Arlington, VA/ Belmopan, Belize
b. Transcribe in-depth interviews	Walter Flores	7/15/2012	Guatemala
c. Complete first draft of assessment	Walter Flores	7/30/2012	Guatemala
d. Review draft and send feedback to the principal investigator	John Marmion, Kim Bautista, and Francis Westby	8/15/12	Arlington, VA and Belmopan, Belize
e. Complete final study report and distribute to country team and partner organizations	Walter Flores	8/30/2012	Guatemala

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V. Annexes

Annex 1: Key Persons Met		
Name	**Title**	**Organization/Affiliation**
Mr. Kim Bautista	Chief of Operations- Vector control	Ministry of Health
Mr. Francis Westby	Dengue Technical Advisor	Ministry of Health
	Regional Manager, Cayo District	Ministry of Health
	Vector Control Specialist, Cayo District	Ministry of Health

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Annex 2: Original Terms of Reference

Work Plan for Belize, 11-15 June, 2012

This is the proposed scope of work for John Marmion, MSH consultant while visiting Belize from May 21-25, 2012. The proposal is to collect information from the Belize National Malaria Control Program for the study evaluating the adequacy of the implementation of control strategies for malaria. The plan includes two basic functions, collection of program data and two in-depth interviews.

In-depth interviews

There are two in-depth interviews to complete. The two interviews should be completed close to the beginning of the trip so any clarifications can be addressed before leaving Belize. Each interview will take approximately one hour. If it is easier for the malaria program, you may send me the names of the interviewees and I can contact them prior to my arrival to coordinate dates and times of the interviews. The interview should gather background and current program information. While interviewing one person is helpful, the interviews show more depth if more than one person is being interviewed for each of the interviews. It can even be the same people for both interviews.

1. Interview A: National Malaria Control Program Authority
   This interview will focus on the program's orientation towards elimination. The questions will include discussion on the following topics:
   A. Feasibility studies for elimination in the country.
   B. Strengths and weaknesses of the program in regards to moving towards an elimination phase and what challenges lie ahead of the program.

2. Interview B: National Malaria Control Program Authority responsible for medicine supply.
   This interview will discuss the medicine supply cycle:
   A. Selection- Treatment scheme
   B. Programming- Medicines in low incidence settings, 3x3x3 treatment and mass treatment
   C. Procurement- Providers for medicines and supplies and the procurement mechanisms.
   D. Distribution: Current problems and mechanisms used for distribution
   E. Availability and Use- Supply questions
   F. Challenges the medicine supply system faces

Documents necessary for in-depth interview completion

1. Studies evaluating technical, operational and financial feasibility for pre-elimination or elimination. **Interview A.**
2. Operational Plan for malaria elimination in the short and long term. **Interview A.**

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Instruments for data collection, Belize, 2012

There are four instruments that will be used for data collection during the trip. The instruments require information about the Belize malaria program. The instruments will review malaria case and treatment information, diagnostics, insecticide treated nets and indoor residual spraying.

1. Cases and treatment in the country.
    a. Number of cases of malaria by species, sex, and distribution of cases in high risk groups
    b. Efficacy of antimalarials "in vivo" and "in vitro"
    c. Treatment Schemes
    d. Treatment adherence and prescribing practices
    e. Positive treatment requirements
    f. Medicine stock out information
2. Insecticide treated net programs
    a. Investigation and setup for the initial program- This include population stratification, vector habits, distribution methods and susceptibility to the different insecticides.
    b. National guidelines
    c. Program initiation- When the program began, type of ITNs and insecticide.
    d. Retreatment of nets
    e. Monitoring data
    f. ITNs in the private sector.
3. Diagnostics
    a. Information and data regarding microscopic diagnosis and rapid tests
    b. Malaria test in the private sector
    c. Quality control of diagnosis
    d. Supply of reagents and supplies
    e. Financing schemes for rapid tests
    f. Training and supervision of personnel for rapid tests and microscopy.
4. Indoor residual spraying
    a. Investigation and setup for the initial program- This include population stratification, vector habits, distribution methods and susceptibility to the different insecticides.
    b. National guidelines
    c. Program initiation- When the program began, type of insecticide.
    d. Stock and stock out data
    e. Monitoring and evaluation data for program
    f. IRS in the private sector
    g. Program indicators

Necessary documents for the data collection instruments.

1. Efficacy studies. **Instrument 1**

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2. Documentation of treatment schemes. **Instrument 1**
3. Documentation of treatment procedures and supervision. **Instrument 1**
4. Patient adherence studies. **Instrument 1.**
5. National guides and procedures for antimalarial procurement. **Instrument 1**
6. National guides and procedures for medicine storage. **Instrument 1**
7. National guidelines for insecticide treated nets. **Instrument 2**
8. Efficacy studies for ITNs, insecticides and vectors. **Instrument 2**
9. Diagnosis guidelines and procedures. **Instrument 3**
10. Documentation for the monitoring of diagnosis quality. **Instrument 3**
11. Studies to evaluate the time between diagnosis and treatment. **Instrument 3**
12. Documentation for the quality of use, concordance of results of rapid tests and protocols for distribution, transportation and storage of rapid tests. **Instrument 3**
13. Training and supervision documentation for personnel that administer rapid tests and microscopy. **Instrument 3**
14. National guidelines and protocols for indoor residual spraying. **Instrument 4**

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Annex 3.

Status of Antimalarial Supply Management in Belize, June, 2012.

Belize is a Central American country located on the Caribbean Sea and is bordered by Mexico on the north and Guatemala on the west and south. It is divided into 6 districts, two northern, two central and two southern. The districts are divided into four regions for vector control purposes. The two northern districts and the two southern districts are combined into northern and southern region. Malaria is found in all districts of the country, although the majority of recent cases have been diagnosed in the two southern districts of Stann Creek and Toledo. The country has experienced steep declines in malaria cases over the past 15 years, decreasing from 9,400 cases in 1995 to fewer than 100 cases in 2011. Between 2006 and 2011 Belize has had fewer than 10 cases of plasmodium falciparum malaria every year; all other cases are attributed to Plasmodium vivax malaria. Declining cases have influenced medication procurement since each year the country has to treat fewer cases, although presumptive treatment accounts for a large percentage of the country's medication use.

Belize hasn't had stock outs of antimalarials in several years at the central storage level although they have had recent stock outs of Primaquine 5mg in the district hospitals. The vector control program which oversees the malaria program was expecting an order in the 2nd quarter 2012 to replenish all stocks.

The malaria treatment protocol was written by the vector control program and the Ministry of Health in 1996 and is currently being updated for publication in 2012 or early 2013. The protocol includes policies for presumptive treatment and radical cure. The guidelines for radical cure indicate that all cases of Plasmodium vivax malaria are treated with a combination of chloroquine for three days and Primaquine for 14days, except for pregnant women, and children under 4 months old. These two groups are treated only with chloroquine. Plasmodium falciparum cases are treated with a combination of chloroquine for three days and primaquine for one treatment three days after diagnosis for patients 13 and older. All other age groups are only treated with chloroquine. National guidelines stipulate severe P. falciparum malaria is treated with quinine and doxycycline. Recent changes to the treatment protocol indicate that P. falciparum treatment failures for imported cases form areas of the world with chloroquine resistance should be treated with artemether-lumefantrine. Presumptive treatment is given to all patients using active and passive case detection methods. Guidelines indicate that antimalarial medicines should be available in all six districts of the country and at all voluntary collaborators even if they haven't had cases recently.

Medicines and supplies are purchased through a yearly national tender process. Quantification is done by reviewing past year's distribution from the central medical store (CMS) and stock on hand. The process is open to the public and transparent. Belize doesn't have national manufacturers for antimalarials so the medications are purchased internationally and imported by a local distributor. The country has purchased antimalarials through the same Belizean distributor for the last 10 years. When medications arrive, the packaging is inspected and samples of medications are sent for quality testing. The AL in the CMS was donated by the Pan American Health Organization using AMI/RAVREDA funds in 2011.

All medicines and supplies are stored at the CMS in Belmopan. The store is temperature controlled and medications are stored in good conditions. There have not been large scale losses due to expiry. All medications and supplies, including antimalarials, are distributed monthly from the CMS to the districts based on monthly orders received in the Belize Health Information System (BHIS). The system keeps

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records of the medicine and commodity stock levels in the CMS and each of the district hospitals. When orders for antimalarials are placed, the chief of operations approves the order and the medications are delivered during the monthly scheduled delivery. Alternatively in an emergency situation, medications can be picked up at the CMS and delivered to the district outside of the monthly order. Vector control services personnel (VCPs) distribute medications to the voluntary collaborators weekly or bi-weekly from the four regional headquarters. Each voluntary collaborator has a minimum level of stock to presumptively treat cases of malaria and collect blood samples which are replenished/ collected by the VCPs.

The national treatment protocol indicates that all persons who appear with malaria symptoms at hospitals, clinics and at voluntary collaborators' sites are given one dose of chloroquine as presumptive treatment. Slides are collected by the VCPs and brought to the microscopist for diagnosis. Patients with positive diagnosis are treated with a full course of antimalarials based on species diagnosis. The first five days of treatment are supervised daily by the VCPs, who return to the villages daily to administer the treatment. After five days, the patient completes the course of treatment unsupervised.

Problems identified: The malaria commodity supply system is well functioning and there are not many problems with the delivery of the commodities. The current protocols do not include all treatment regimens and are being revised to include all treatment protocols. There is not a well defined supervision system for VCPs and voluntary collaborators in the country. Medicines that are distributed to the voluntary collaborators are not monitored for quality and there is not currently a system in place to monitor them in an ongoing manner. This could be a problem over time since medications are distributed to voluntary collaborators where malaria incidence is low or non-existent and therefore medicine consumption is low. There are some problems with timely diagnosis due to the country having low incidence settings. There have been a few instances where people report malaria symptoms, but are not tested in a timely manner. This has lead to reservoirs of parasites in areas of the country with low transmission.

Short-term plans: The Vector control services is revising and updating the treatment policies and protocols during 2012. The revised policies should be published in late 2012 or early 2013. The vector control department is working with the chief pharmacist to develop a strategy to review medications regularly. Vector Control Services department is working with the health education department to develop strategies to inform the public of the threat of malaria even in areas of the country with low incidence. The country is developing strategies to continuously train hospital and clinic personnel to train staff to assess for malaria cases when patients present with malaria cases so all cases are detected timely.

Table 1. Antimalarial stock levels on 4/23/12 in the Central medical Store.

	Obligatory medicine? Y=1, N=0	Stock on hand in units	Average monthly comsumption	Months of availability based on distribution
Artemether-Lumefantrine 20/120 mg X 24 tablet	0	240	0.00	
Chloroquine phosphate 150 mg tablet	1	20,000	10,000.00	2.0
Chloroquine phosphate 100 mg tablet	0	12,000	0.00	
Primaquine phosphate 5 mg tablet	1	0	100.00	0
Primaquine phosphate 15 mg tablet	1	8,000	100.00	80.0

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